ANALYSIS

24(102), March - April, 2020

ISSN
2321–7359
EISSN
2321–7367

Medical Science

Sleeping quality in adults with moderate to severe persistence allergic rhinitis Saudi Arabia

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Article History
Received: 27 October 2019
Reviewed: 29/October/2019 *to* 08/December/2019
Accepted: 09 December 2019
E-publication: 20 December 2019
P-Publication: March - April 2020

Citation
Danah Aljomah, Abdullah Alshakhs, Areej Alasiri, Ahad Almohammadi, Hanin Alsuwailem, Mousa Alshehri, Wedyan Almosa, Ahoud Almuneef, Wejdan Suwayyid. Sleeping quality in adults with moderate to severe persistence allergic rhinitis Saudi Arabia. *Medical Science*, 2020, 24(102), 565-574

General Note

Article is recommended to print as color digital version in recycled paper.

ABSTRACT

Background: Allergic rhinitis is a common inflammatory disorder of the nasal mucosa induced by an allergen. Sleep impairment is a significant problem for patients with allergic rhinitis. *Study objectives:* The current study aimed to assess the quality of sleep among cases with AR in comparison to non-cases and also to determine the quality of sleep correlates among partisans. *Methods:* This was a quantitative cross-sectional study conducted in 2019 from the period of July to October 2019 among the total of 597 Saudi adults who were randomly selected to participate whose ages ranged from 18 to 65 years. The participants have answered a self-reported questionnaire (PSQI). The collected data were analyzed by SPSS version 22. All statistical analysis was done using two-tailed tests and an alpha error of 0.05. A P-value is less than or equal to 0.05 considered to be statistically significant. *Results:* Among the participants, 509 (85.3%) were diagnosed as allergic rhinitis (AR) cases which were severed among 20.3% and moderate among 55.4% of them. good sleep quality was recorded among 38.3% of AR cases compared to 53.4% of the comparison group. Age and gender had no significant association with good sleep quality among the participants (P> 0.05). However, the duration of disease (P=.014) and disease severity (P=.001) had a significant correlation. *Conclusion:* It was concluded that sleep quality is altered in AR patients. Sleep quality was affected in moderate and severe, and in particular in severe AR. Feeling cold or hot with the need for sleep medication was the most area affecting sleep quality. Sleep disturbance is common in allergic rhinitis, especially in more severe forms. Disease duration and severity should be considered as contributing factors.

Keywords: Allergic rhinitis, Sleep disorder, good sleep quality, adults.

1. BACKGROUND

Allergic rhinitis is a common inflammatory disorder of the nasal mucosa induced by an allergen (Varshney J and Varshney H, 2015). It is characterized by four major symptoms–rhinorrhea, sneezing, nasal itching, and nasal congestion (Cao Y et al. 2018). The interference of these symptoms with sleep leads to a significant negative impact on the patient's quality of life and performance. Several studies have correlated between Allergic rhinitis and sleep disorders such as nasal obstruction or congestion and abnormal breathing during sleep, snoring, and sleep apnea (Rappai M et al. 2003, Meltzer EO et al., 2009). The recent publication of the Pediatric Allergies in America survey reported that congestion is the main symptom affecting children (Meltzer EO et al., 2009). In a similar survey conducted in more than 7,000 individuals, 89.3% of whom were adults, the incidence of sleep disturbance in Allergic rhinitis patients was once again confirmed (Meltzer et al., 2009).

Sleep impairment is a significant problem for patients with Allergic rhinitis. In a recent survey of individuals with Allergic rhinitis, 68% of respondents with PAR and 48% with seasonal Allergic rhinitis (SAR) reported that their condition interfered with sleep (Blaiss et al., 2005). Sleep disturbance can be caused by nasal congestion; however, other symptoms of Allergic rhinitis and the release of inflammatory mediators may also influence sleep and day time fatigue. The symptoms of Allergic rhinitis —in particular, nasal congestion—adversely affect sleep, and the degree of sleep impairment is used in the Allergic Rhinitis and its Impact on Asthma guidelines to classify Allergic rhinitis severity (Meltzer et al., 2009). Sleep disturbances correlated to the Allergic rhinitis include sleep-disordered breathing (ranging from snoring to obstructive sleep apnea [OSA] or hypopnea) and microarousals (Mc Nicholas et al., 1981), although one study suggested that Allergic rhinitis is not a major risk factor for OSA syndrome (Kramer et al., 2001). Individuals with frequent nighttime symptoms of rhinitis have been shown to be more likely to have chronic excessive daytime sleepiness or chronic nonrestorative sleep than those who rarely or never have such symptoms (Young T, Finn L, Kim H, 1997). Studies have demonstrated objective evidence that adults with PAR have more sleep disturbance than healthy control participants (Rimmer et al., 2009).

People with Allergic rhinitis had reduced work productivity and quality of life (Marshall et al. 2000; Kessler et al., 2001). Allergic rhinitis can affect children's learning ability and performance at school and cause somnolence and inability to concentrate (Lack G, 2001). These effects may be a direct result of allergic symptoms but are likely to be exacerbated by sleep impairment (Simons FE, 1996). Sleep-disordered breathing and sleep disturbance are found to be directly correlated to decreased quality of life (Flemons WW, and Tsai W, 1997), as evidenced by experimentally induced sleep fragmentation in healthy people being correlated to impaired

mental flexibility and attention, increased daytime sleepiness, and impaired mood (Martin et al., 1996; Martin et al., 1997). Adults with Allergic rhinitis have difficulty getting a good night's sleep and experience problems doing schoolwork (Juniper et al. 1994), and children with allergic rhinitis and snoring have poorer school performance than healthy individuals (Fisher et al., 2005). Daytime fatigue, difficulty concentrating, and impaired psychomotor performance are commonly reported by Allergic rhinitis patients and may reduce their ability to perform the physical and social tasks of daily living (Wilken et al. 2002). An Internet-based survey of 1,322 individuals with self-reported AR found that PAR and SAR interfered with sleep (68% and 51% of respondents, respectively) and their ability to carry out their daily routine (58% and 48%, respectively) (Blaiss et al. 2005).

Aim of work

The current study aimed to assess the quality of sleep among cases with Allergic rhinitis in comparison to non-cases and also to determine the quality of sleep correlates among partisans.

Research Objectives

1. To assess the Prevalence of Allergic rhinitis among adults in Saudi Arabia.
2. To evaluate the relationship between AR and sleep disorder among adult with persistent AR
3. To compare the difference between sleeping disorders in adults with allergic rhinitis and adults without allergic rhinitis
4. Assess the degree of association between allergic rhinitis and sleep disorder and evaluation of sleep quality in adult

2. MATERIALS AND METHODS

This was a quantitative study conducted in 2019 from the period of July to October 2019 among a total of 597 individuals who were randomly selected to participate whose ages ranged from 18 to 65 years. All subjects gave their informed consent for inclusion before they participated in the study by Cross-sectional self-report questionnaire disturbed randomly among the population that assesses sleep quality over a 1-month time interval (Pittsburgh Sleep Quality Index)

The study included Saudi adults who diagnosed with allergic rhinitis and healthy adults who don't have any medical illness which affects their sleeping quality. With exclusion to other conditions that affect patient sleeps such as obesity, adenoid. Pittsburgh Sleep Quality Index (PSQI) modified from the original in order to fit the first 9 items (which are the only items that contribute to the total score) on a single page. Item 10, which is the second page of the scale, does not contribute to the PSQI score. In scoring the PSQI, seven component scores are derived, each scored 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a global score (range 0 to 21). Higher scores indicate worse sleep quality. Questions were answered by a random population, which was translated and validated into the Arabic language.

The study was approved by the ethical committee in
IRB registration Number with KACST,KSA : H-01-R-01
IRB registration Number with OHRP/NIH,USA: IRB00010471
Approval number federal wide assurance NIH,USA: FWA00018774
LOG Number:19-556

Data analysis

After data were extracted, it revised, coded and fed to statistical software IBM SPSS version 22. All statistical analysis was done using two-tailed tests and an alpha error of 0.05. A P-value less than or equal to 0.05 considered to be statistically significant. Descriptive analysis based on frequency and percent distribution was done for all participants' bio- demographic data including AR clinical data. After summing all components score for the PSQI scale, it was presented in the form of mean and standard deviation with score range. The overall score was categorized into poor for those who had score 19-27 points, moderate for those who had scored 9-18 points and good for those who had scored 0-9 points. The relation between participants' allergic status and PSQI items or between participants' bio- demographic data and sleep quality was assessed using the Pearson chi-square test.

3. RESULTS

The study included 597 cases whose ages ranged from 18 to 65 years old with a mean age of 34.0 ± 11.5 years. Females were 74.8% of the sample. Among the participants, 509 (85.3%) were diagnosed as allergic rhinitis (AR) cases which were severed among 20.3%

and moderate among 55.4% of them. Exact of 10% of the AR cases had the disease for less than one years and 6.5% had the disease for more than 10 years (Table 1).

Table 1 Bio-demographic data of study participants

Bio-demographic data		No	%
Age in years			
o	18-24	166	27.8%
o	25-29	97	16.2%
o	30-39	136	22.8%
o	40-49	123	20.6%
o	50+	75	12.6%
Gender			
o	Male	150	25.2%
o	Female	445	74.8%
Have allergic rhinitis			
o	No	88	14.7%
o	Yes	509	85.3%
Diseases duration (n=509)			
o	< 1year	51	10.0%
o	1-2	152	29.9%
o	3-5	187	36.7%
o	6-9	86	16.9%
o	10+	33	6.5%
Diseases severity (n=509)			
o	Mild	145	24.3%
o	Moderate	331	55.4%
o	Severe	121	20.3%

Table (2) illustrates the distribution of PSQI items according to allergic rhinitis status among study participants. About 21% of AR cases sleep for more than 7 hours compared to 27.3% of comparison cases with no statistical significance. Also, 36.1% of AR cases wake up in the middle night for more than 3 times weekly compared to 30.7% of comparison cases. As for getting up to use the bathroom, it was recorded for more than 3 times a week among 31.2% of AR cases compared to 22.7% of the comparison group. About 30% of AR cases had difficulty breathing more than 3 times a week compared to 27.3% of the comparison group. Coughing

or snoring loudly was recorded for more than 3 times a week among 21% of AR cases compared to 17% of the comparison group. All these differences were statistically insignificant. Feeling too cold was significantly more recorded among AR cases than the comparison group (22.6% vs. 17%) (P=.042). Also feeling too hot was recorded for more than 3 times weekly among 26.7% of AR cases compared to 17% (P=.022). Bad dreams were recorded for more than 3 times a week among 18.1% of AR cases compared to 14.8% of the comparison group. Exact of 19.3% of AR cases needed medication to sleep more than 3 times weekly compared to 9.1% of the comparison group (P=.029). Also, sleep quality was recorded as good or very well by 16.5% of the AR cases compared to 27.3% of the comparison group (P=.049).

Table 2a Distribution of PSQI items according to allergic rhinitis status among study participants

PSQI items		Total	Have allergic rhinitis				*P-value*
			No		Yes		
		No (%)	No	%	No	%	
Minutes in bed till sleep	< 15 minutes	114 (19.1%)	17	19.3%	97	19.1%	.626
	16-30 minutes	180 (30.2%)	28	31.8%	152	29.9%	
	31-60 minutes	163 (27.3%)	27	30.7%	136	26.7%	
	> 60 minutes	140 (23.5%)	16	18.2%	124	24.4%	
Sleep hours	> 7 hours	130 (21.8%)	24	27.3%	106	20.8%	.521
	6-7 hours	157 (26.3%)	23	26.1%	134	26.3%	
	5-6 hours	148 (24.8%)	18	20.5%	130	25.5%	
	< 5 hours	162 (27.1%)	23	26.1%	139	27.3%	
Cannot get to sleep within 30 minutes	Not during the past Month	113 (18.9%)	20	22.7%	93	18.3%	.370
	Less than once a week	118 (19.8%)	21	23.9%	97	19.1%	
	1-2 times a week	139 (23.3%)	20	22.7%	119	23.4%	
	3 or more times a week	227 (38.0%)	27	30.7%	200	39.3%	
Wake up in the middle of the night or early morning	Not during the past month	97 (16.2%)	13	14.8%	84	16.5%	.644
	Less than once a week	121 (20.3%)	21	23.9%	100	19.6%	
	1-2 times a week	168 (28.1%)	27	30.7%	141	27.7%	
	3 or more times a week	211 (35.3%)	27	30.7%	184	36.1%	
Have to get up to use the bathroom	Not during the past Month	125 (20.9%)	20	22.7%	105	20.6%	.413
	Less than once a week	137 (22.9%)	24	27.3%	113	22.2%	
	1-2 times a week	156 (26.1%)	24	27.3%	132	25.9%	
	3 or more times a week	179 (30.0%)	20	22.7%	159	31.2%	
Cannot breathe comfortably	Not during the past Month	145 (24.3%)	22	25.0%	123	24.2%	.631
	Less than once a week	134 (22.4%)	24	27.3%	110	21.6%	
	1-2 times a week	141 (23.6%)	18	20.5%	123	24.2%	
	3 or more times a week	177 (29.6%)	24	27.3%	153	30.1%	
Cough or snore loudly	Not during the past month	235 (39.4%)	40	45.5%	195	38.3%	.157
	Less than once a week	143 (24.0%)	25	28.4%	118	23.2%	

	1-2 times a week	98 (16.4%)	9	10.2%	89	17.5%	
	3 or more times a week	121 (20.3%)	14	15.9%	107	21.0%	
Feel too cold	Not during the past month	191 (32.0%)	20	22.7%	171	33.6%	.042*
	Less than once a week	145 (24.3%)	28	31.8%	117	23.0%	
	1-2 times a week	131 (21.9%)	25	28.4%	106	20.8%	
	3 or more times a week	130 (21.8%)	15	17.0%	115	22.6%	
Feel too hot	Not during the past month	159 (26.6%)	18	20.5%	141	27.7%	.022*
	Less than once a week	157 (26.3%)	33	37.5%	124	24.4%	
	1-2 times a week	130 (21.8%)	22	25.0%	108	21.2%	
	3 or more times a week	151 (25.3%)	15	17.0%	136	26.7%	

Table 2b Distribution of PSQI items according to allergic rhinitis status among study participants

PSQI, continued		Total	Have allergic rhinitis				*P-value*
			No		Yes		
		No (%)	No	%	No	%	
Have bad dreams	Not during the past month	189 (31.7%)	32	36.4%	157	30.8%	.707
	Less than once a week	184 (30.8%)	25	28.4%	159	31.2%	
	1-2 times a week	119 (19.9%)	18	20.5%	101	19.8%	
	3 or more times a week	105 (17.6%)	13	14.8%	92	18.1%	
Have pain	Not during the past month	208 (34.8%)	37	42.0%	171	33.6%	.118
	Less than once a week	129 (21.6%)	23	26.1%	106	20.8%	
	1-2 times a week	122 (20.4%)	14	15.9%	108	21.2%	
	3 or more times a week	138 (23.1%)	14	15.9%	124	24.4%	
Have taken medicine to help you sleep	Not during the past month	319 (53.4%)	59	67.0%	260	51.1%	.029*
	Less than once a week	98 (16.4%)	13	14.8%	85	16.7%	
	1-2 times a week	74 (12.4%)	8	9.1%	66	13.0%	
	3 or more times a week	106 (17.8%)	8	9.1%	98	19.3%	
Had trouble staying awake while driving, eating meals, or engaging in social activity?	Not during the past month	299 (50.1%)	47	53.4%	252	49.5%	.254
	Less than once a week	140 (23.5%)	24	27.3%	116	22.8%	
	1-2 times a week	89 (14.9%)	12	13.6%	77	15.1%	
	3 or more times a week	69 (11.6%)	5	5.7%	64	12.6%	
	Very good	108 (18.1%)	24	27.3%	84	16.5%	
	Fairly good	296 (49.6%)	43	48.9%	253	49.7%	

Sleep quality	Fairly bad	157 (26.3%)	17	19.3%	140	27.5%	.049*
	Very bad	36 (6.0%)	4	4.5%	32	6.3%	
Problems to keep up enough enthusiasm	No problem at all	80 (13.4%)	14	15.9%	66	13.0%	.294
	Only a very slight problem	245 (41.0%)	42	47.7%	203	39.9%	
	Somewhat of a problem	212 (35.5%)	26	29.5%	186	36.5%	
	A very big problem	60 (10.1%)	6	6.8%	54	10.6%	

P: Pearson X^2 test * P < 0.05 (significant)

With regard to the overall PSQI score (Table 3), it ranged from 0-21 among AR cases with a mean value of 10.1 ± 4.2 compared to 8.8 ± 3.8 for comparison group with recorded statistical significance (P=.004). Totally, good sleep quality was recorded among 38.3% of AR cases compared to 53.4% of the comparison group (Figure 1).

Table 3 PSQI score among participants according to allergic rhinitis status

	Global PSQI score			
Have allergic rhinitis				*P-value*
	Range	Mean ± SD	Median	
No	2-19	8.8 ± 3.8	9.0	
Yes	0-21	10.1 ± 4.2	9.0	.004*
Total	0-21	9.9 ± 4.2	9.0	

P: Independent t-test * P < 0.05 (significant)

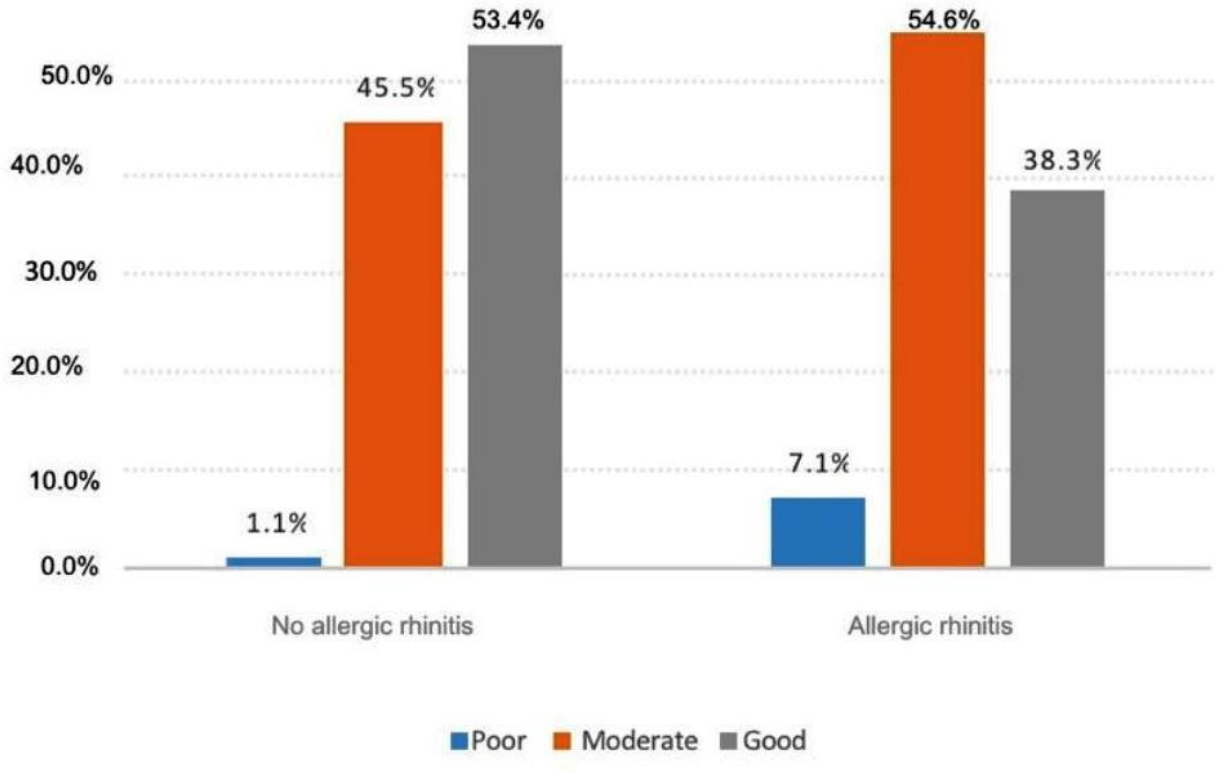

Figure 1 Overall sleep quality based on PSQI according to allergic rhinitis status

On relating overall sleep quality with participants' bio-demographic data (Table 4), good sleep quality was recorded among 41.6% of cases aged below 25 years compared to 40% of those who aged above 40 years with no recorded statistical significance. As for gender, good sleep quality was recorded among 46% of male cases compared to 38.7% of females (P=.170). Considering the duration of disease, good sleep quality was recorded among 51% of those who had the diseases recently (less than 1 year) compared to 57.6% of those who had the disease for more than 10 years and 27.8% of those who had the disease between 1 to10 year (P=.014). Also, 57.9% of those who had mild disease severity recorded good sleep quality compared to 17.4% of those with severe AR (P=.001).

Table 4 Overall sleep quality based on PSQI according to participants' bio- demographics data

Bio-demographic data		Overall sleep quality						*P-value*
		Poor		Moderate		Good		
		No	%	No	%	No	%	
Age in years	18-24	9	5.4%	88	53.0%	69	41.6%	.670
	25-29	6	6.2%	43	44.3%	48	49.5%	
	30-39	9	6.6%	78	57.4%	49	36.0%	
	40-49	7	5.7%	70	56.9%	46	37.4%	
	50+	6	8.0%	39	52.0%	30	40.0%	
Gender	Male	11	7.3%	70	46.7%	69	46.0%	.170
	Female	26	5.8%	247	55.5%	172	38.7%	
Duration of disease	< 1 year	4	7.8%	21	41.2%	26	51.0%	.014*
	1-2	11	7.2%	80	52.6%	61	40.1%	
	3-5	14	7.5%	121	64.7%	52	27.8%	
	6-9	5	5.8%	44	51.2%	37	43.0%	
	10+	2	6.1%	12	36.4%	19	57.6%	
Disease severity	Mild	3	2.1%	58	40.0%	84	57.9%	.001*
	Moderate	15	4.5%	179	54.1%	137	41.4%	
	Severe	19	15.7%	81	66.9%	21	17.4%	

P: Pearson X^2 test * P < 0.05 (significant)

4. DISCUSSION

Allergic rhinitis occurs when allergens in the air are breathed by a patient that is allergic to them, irritating and inflaming the nasal passages. Allergens may include dust mites, pollen, molds, or pet dander. In people who are allergic to them, these particles stimulate the release of a chemical in the body that causes nasal allergic rhinitis symptoms (Wheatley LM and Togias A, 2015; Thompson et al., 2000).

Our examination uncovered that most of participants were cases with moderate to serious AR. As to quality, it was altogether better among members with no AR as great sleep quality was recorded among about 33% of AR cases and among the greater part of the correlation gathering. The most influenced region in sleep cleanliness was feeling hot or cold during sleep notwithstanding the capacity to sleep simply subsequent to having sleep medicine as it was recorded among half of the AR cases.

Past studies revealed that sleep issues are basic in individuals with allergic rhinitis. It was discovered that sleep is drastically hindered by allergic manifestations and that the level of impedance is identified with the seriousness of those side effects.

Furthermore, sleep issues are connected with weakness and day time sleepiness just as diminished efficiency at work or school, disabled learning and memory, sadness, and decreased quality of life (New York, NY Kluwer Academic Plenum 2003; Kremer Bden Hartog HM and Jolles J, 2002). As to associates, disease span was one of the noteworthy indicators as sleep quality was better among recently analyzed and old cases. This might be clarified by that recently analyzed cases still had no polyploid changes with no hindrance and old cases had atrophied mucosa which improves relaxing. Likewise, disease seriousness recorded a beneficial outcome on sleeping quality as those with increasingly extreme AR had more obstacles which conversely influences sleep quality.

In concurrence with our findings, it was discovered that the power of sleep issue found in some subscales was corresponded with target markers of allergic rhinitis seriousness (Loekmanwidjaja J, 2018). Moreover, another study detailed that grown-ups and youngsters experiencing serious industrious AR experienced sleep objections altogether more frequently than members with discontinuous or mild persistent AR (Leger D and Bonnefoy B, 2017). Sleep was significantly more impaired in patients with severe AR than in those with mild type (Archives of Internal Medicine).

5. CONCLUSIONS AND RECOMMENDATIONS

After finishing the current survey, it was concluded that sleep quality is altered in AR patients. Sleep quality was affected in moderate and severe, and in particular in severe AR. Feeling cold or hot with the need for sleep medication was the most area affecting sleep quality. Sleep disturbance is common in allergic rhinitis, especially in more severe forms. Disease duration and severity should be considered as contributing factors.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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